

Measurement of the Hard Fraction of the Neutron Spectrum SOV/89-6-5-17/33
in the Reactor BR-5 by Means of a He³-Ionization Chamber

and therefore washing out due to helium rebound in the chamber may be neglected. During measurement of the active zone the helium rebound in the momentum spectrum is, however, distinctly marked. It was, for the time being, taken into account only on the basis of theoretical calculations and will be experimentally checked after all work connected with putting the BR-5 into operation will have been completed. There are 1 figure and 7 references, 1 of which is Soviet.

SUBMITTED: January 8, 1959

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YUTKIN, M. G., ABRAMOV, A. I.

"The Measurement of Neutron Spectra in Fast Reactors by Means of an Ionization Chamber Filled with He3."

paper presented at the Symposium of the International Atomic Energy Agency on Pile Neutron Research in Physics, Vienna, 17-21 Oct 1960.

LEYPUNSKIY, A.I.; ABRAMOV, A.I.; ALEKSANDROV, Yu.A.; ANIKIN, G.V.; BONDARENKO,
I.I.; GUSEYNOV, A.G.; IVANOV, V.I.; KAZACHKOVSKIY, O.D.; KUZNETSOV,
V.F.; KUZ'MINOV, B.D.; MOROZOV, V.N.; NIKOLAYEV, M.N.; SAL'NIKOV,
O.A.; SMIRENKIN, G.N.; SOLDATOV, A.S.; USACHEV, L.N.; YUTAIN, F.G.

Spatial and energy distribution of neutrons in the BR-5 fast reactor.
Atom. energ. 11 no.6:498-505 D '61. (MIRA 14:11)
(Nuclear reactors) (Neutrons)

YUTKIN, M.G.

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21-1000

AUTHORS:

Leypunskiy, A. I., Abramov, A. I., Aleksandrov, Yu. A.,
Anikin, G. V., Bondarenko, I. I., Guseynov, A. G.,
Ivanov, V. I., Kazachkovskiy, O. D., Kuznetsov, V. F.,
Kuz'minov, B. D., Morozov, V. N., Nikolayev, M. N.,
Sal'nikov, O. A., Smirenkin, G. N., Soldatov, A. S.,
Usachev, L. N., Yutkin, M. G.

TITLE:

Investigation of the BP-5 (BR-5) fast reactor (spatial and energy distributions of neutrons)

PERIODICAL: Atomnaya energiya, v. 11, no. 6, 1964, 498 - 505

TEXT: The fast research reactor BR-5 and its experimental equipment is described in brief and some of its neutron spectra are given and discussed. The following data are given: fuel - plutonium oxide; coolant - sodium; reflector - thin layer of natural uranium plus thick layer of nickel; power - 5000 kw. The reactor has many vertical and horizontal holes for technical and physical studies and is well supplied with experimental equipment. Leypunskiy gave a detailed description of the BR-5 reactor at

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Investigation of the...

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B102/B130

the Second Geneva Conference (1958). Inside the core the neutrons have energies of more than 100 kev which they lose almost completely in passage through reflector and shield. In the outer layers of the shield, their mean energy does not exceed some tens of ev. In the kev range ($E_n > 50$ kev) spectra were measured for the most important beams and channels. For the other cases, they were determined from threshold reactions. The soft part of the spectrum within the reflector was determined from the spatial distribution of neutrons with $E_n \approx 5$ ev, recorded with gold resonance indicators. The total neutron flux was determined only at the points where the Pu^{239} fission cross section was constant. Direct neutron spectrum measurements were carried out in a vertical (OK-70) and a horizontal (B-3) channel using $(\text{He}^3 + \text{Ar})$ -filled ionization chamber in the first case and the neutron transmission method with n-hexane in the second. The neutron spectrum of the horizontal channel was also determined by photoemulsions. From the rates of indicator and fission reactions $\text{Au}^{197}(n, \gamma)$, $\text{U}^{235}(n, f)$, $\text{Pu}^{239}(n, f)$, $\text{Th}^{232}(n, f)$, $\text{Na}^{23}(n, \gamma)$, $\text{Cu}^{63}(n, \gamma)$, and $\text{Al}^{27}(n, \alpha)$ the abrupt

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Investigation of the...

drop in neutron energy in the Ni reflector was determined, and the activity caused by resonance neutrons ($E_n = 4.9$ ev). The fast neutron flux ($E_n > 1.4$ Mev) in the core center was found to be $(2.4 \pm 0.2) \cdot 10^{14}$, and total flux was $(8.2 \pm 0.3) \cdot 10^{14}$. Experimental results were verified by energy-group calculations (18 groups). Good agreement between theory and experiment was also found for the channel spectra. The authors thank D. S. Pinkhasik, N. N. Aristarkhov, and the reactor personnel for assistance. There are 10 figures, 2 tables, and 2 Soviet references.

SUBMITTED: August 17, 1961

Table 1. Reaction cross sections in the core center.

Legend: (1) Reaction; (2) experiment; (3) σ calculated, given in barns.

Fig. 7. Neutron transmission spectrum (n-hexane) for the horizontal channel B-3.

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24.6600

AUTHORS: Abramov, A. I., Yutkin, M. G.

TITLE: $\text{Ne}^{21}(n,\alpha)\text{O}^{18}$ reaction with slow neutrons

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 41,
no. 4(10), 1961, 1023-1024

TEXT: Calculations have shown that neon isotopes enter only one exothermic reaction with neutrons, namely, $\text{Ne}^{21}(n,\alpha)\text{O}^{18}$. A spherical ionization chamber with pure neon of 10 atm pressure was placed into a beam of slow neutrons from the thermal column of a BP-5 (BR-5) reactor. The cut-off curve was taken with the aid of a continuous discriminator. The pulse spectrum, a peak with a prolonged tail on its left side, was found by differentiating this curve. The energy of the reaction, as determined from the position of the peak, is $Q = 0.696 \pm 0.019$ Mev. Within the limits of the experimental error this value agrees with the calculated value of $Q = 0.704$ Mev. The cross section for the $\text{Ne}^{21}(n,\alpha)\text{O}^{18}$ reaction with thermal neutrons was measured by comparing it with the cross section

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Ne²¹(n,α)O¹⁸ reaction with slow neutrons

S/056/61/041/004/002/019
B108/B102

for a He³(n,p)H³ reaction. Two equal chambers, one filled with neon and the other with He³, were used for this purpose. They were alternately placed at one and the same spot, after which their counting rates were determined. The measurements were made with scattered neutrons a few meters away from the outlet of the thermal column. The ratio of the count rates was $13,090 \pm 208$. Since the He³ content in the working mixture and the Ne²¹ content in natural neon (0.257%) were known, it was easy to find the ratio of the cross sections: $\sigma_{\text{Ne}^{21}} / \sigma_{\text{He}^3} = 0.0177 \pm 0.0059$. The uncertainty of the result is only due to the experimental error. With the (n,p) reaction cross section for He³ which amounts to 5400 ± 200 barns, the authors found $\sigma[\text{Ne}^{21}(n,\alpha)\text{O}^{18}] = 96 \pm 33$ barns. Using the value of $\sigma_{\text{He}^3} = 5400$ barns, which was obtained for a neutron velocity of 2200 m/sec, is justified since the neutron spectrum from the thermal column of the

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$\text{Ne}^{21}(\text{n}, \alpha)\text{O}^{18}$ reaction with slow neutrons

BR-5 reactor is nearly Maxwellian. It is noted that the $\text{Ne}^{21}(\text{n}, \alpha)\text{O}^{18}$ reaction, together with the $\text{He}^3(\text{n}, \text{p})\text{H}^3$ reaction, may be used in fast-neutron spectrometry. The pulses from recoil nuclei will not interfere up to neutron energies of about 4 Mev. [Abstracter's note: Essentially complete translation.] There are 5 references: 2 Soviet and 3 non-Soviet. The three references to English-language publications read as follows: F. Everling et al., Nucl. Phys., 18, 529, 1960; R. J. Bell et al., Nucl. Phys., 14, 270, 1959; D. Hughes, R. B. Schwartz. Neutron Cross Sections, New York, 1958.

SUBMITTED: April 25, 1961

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"APPROVED FOR RELEASE: 03/15/2001

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YUSUPOV, T.; LEVINA, L.M., red.

[Diagnosis and surgical treatment of rare forms of external abdominal hernias] Diagnostika i operativnoe lechenie redkikh form naruzhnykh briushnykh gryzh. Tashkent, Izd-vo "Meditsina" UzSSR, 1965. 142 p. (MIRA 18:4)

ANNAYEV, R.G.; MYALIKGULYYEV, G.; YUSUPOV, T.M.

Longitudinal and transverse galvanomagnetic effect in the nickel-palladium alloy. Izv. AN Turk. SSR. Ser. fiz.-tekhn., khim i geol. nauk no.3:13-17 '64 (MIRA 18:1)

1. Turkmenskiy gosudarstvennyy universitet im. A.M. Gor'kogo.

LEVENBERG, I.; POKROVSKIY, V.; YUTLANDOV, I.

Simple nuclear reactions on Ca^{48} induced by high-energy
protons. Zhur. eksp. i teor. fiz. 43 no.5:1619-1624
N '62. (MIRA 15:12)

1. Ob'yedinennyy institut yadernykh issledovaniy.
(Calcium--Isotopes) (Nuclear reactions)
(Protons)

LEVENBERG, I.; POKROVSKIY, V.; DE-HOU, Rhen; TARASOVA, L.;
YUTLANDOV, I.

The (p, pn) and (p, n) reactions on Sc^{45} induced by high-energy protons, Dubna, Ob"edinennyyi in-t iadernykh issledovaniy, 1963. 15 p.

WITLANDOV, I. A.

YUTLANDOV, I. A.

AID P - 3167

Subject : USSR/Chemistry

Card 1/1 Pub. 119 - 2/8

Authors : Murin, A. N., V. D. Nefedov, and I. A. Yutlandov (Leningrad)

Title : Preparation and separation of radioisotopes without carriers

Periodical : Usp. khim., 24, 5, 527-574, 1955

Abstract : The cyclotron and uranium reactor serve as sources for the production of radioisotopes without carriers. The cyclotron reactions are discussed in great detail, and various methods of separating the following radioactive elements are given: T, Be, C, F, Na, Mg, P, S, Ar, Ca, Sc, V, Cr, Mn, Fe, Co, Cu, Zn, Ga, Ge, As, Se, Br, Kr, Sr, Y, Zr, Mo, Tc, Ru, Rh, Pd, Ag, Cd, In, Sn, Sb, Te, Xe, Cs, La, W, Os, Ir, Pt, Au, Hg, Pb, Bi and At. Four drawings, 3 tables, 128 references, 7 Russian (1930-1954).

Institution : None

Submitted : No date

YUTLANDOV, I. A.

Name: YUTLANDOV, I. A.

Dissertation: Radiochemical study of the deep fission reaction of dis-integrated copper isotopes when irradiated with protons of an energy of 660 Mev

Degree: Cand Chem Sci

DEFENDED AT

Affiliation: Leningrad Order of Lenin State U imeni A. A. Zhdanov,
Radium Inst imeni V. G. Khlopin of the Acad Sci UESR

PUBLICATION

~~Defense~~ Date, Place: 1956, Leningrad

Source: Knizhnaya Letopis', No 52, 1956

MURIN, A.M.; YUTLANDOV, I.A.

Establishing the cosmic age of meteorites [with summary in English].
Geokhimiia no.1:33-35 '57. (MIRA 12:3)

1. Radium Institute, Academy of Sciences, U.S.S.R., Leningrad
State University.

(Meteorites--Age)

YUTLANDOV, I. A.

SOV/48-22-7-7/26

AUTHORS:

Baranovskiy, V. I., Murin, A. N., Pokrovskiy, V. N.,
Yutlandov, I. A.

TITLE:

Mass Numbers of Tb Isotopes Showing Neutron Deficiency
(O massovykh chislakh neytronodefitsitnykh izotopov Tb)

PERIODICAL:

Izvestiya Akademii nauk SSSR, Seriya fizicheskaya, 1958,
Vol. 22, Nr 7, pp. 808-810 (USSR)

ABSTRACT:

For a more precise determination of the mass numbers of Tb isotopes present in the fraction, the attempt was made to establish the genetic connections by means of a repeated chromatographic separation of the daughter elements, and by examining these. This method permits to determine both the mass number of the parent isotope (for a known daughter isotope), and its half-life (provided that the quantity of daughter isotope separated will be proportional to $e^{-\lambda t}$ for equal intervals between the separations, λ being the decay coefficient). In this way the Tb isotopes with $A = 149, 151$, and 153 may be studied if the corresponding radioactive Gd isotopes ($Z = 64$) are known. Other Tb isotopes, however, in decay transmutate to stable Gd isotopes. With all four separat-

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Mass Numbers of Tb Isotopes Showing Neutron Deficiency

ions carried out from Tb, two isotopes Gd^{153} and Gd^{151} were observed. No other daughter elements were found in noticeable quantities. The isotope Tb^{153} with $T_{1/2} = 2,4$ days may be regarded as certainly existent. Best visible in the γ -spectrum of Tb^{153} is the group of lines in the range from 205 to 210 keV. The intensity of this γ -line group observed in the Tb fraction spectrum decreased at a rate of $T_{1/2} \sim 2,7$ days. The other Gd^{151} isotope found (daughter isotope) belongs to class B, its half-life $T_{1/2}$ being 120 - 150 days according to the authors' data, the γ -spectrum consisting of the lines 154 and 247 keV. For the parent substance a half-life $T_{1/2} = 18 \pm 2$ hours was found. - In view of the genetic connection between Tb^{151} and Gd^{151} which was not observed before, the mass numbers for these isotopes may be considered as more trustworthy than had formerly been assumed. Since the presence of Tb^{154} in the Tb fraction could neither be confirmed nor excluded in these experiments, it cannot be stated with certainty to which of these isotopes (or their mixtures) the 270 and 345 keV γ -lines belong that were observed by the authors. - The fact that Eu is absent among the daughter elements permits us to say that the α -decay component in Tb^{151}

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Mass Numbers of Tb Isotopes showing Neutron Deficiency

does not exceed 1 % (as compared with electron capture). Examination of short-life reaction products of a low Ta splitting made it possible to establish a genetic connection between Tb^{149} and Gd^{149} . If the mass number determined for Tb^{149} is considered as trustworthy, this connection permits to take the A value for Gd^{149} as well. - Acknowledgement is made to B. K. Preobrazhenskiy and V. N. Kel'nikov who were helpful in chromatographic separation, and to N. Bushuyev for his assistance with the measurements. There are 1 figure, 1 table, and 15 references, 6 of which are Soviet.

ASSOCIATION: Radiyevyy Institut im. V. G. Khlopina Akademii nauk SSSR.
(Radium Institute imeni V. G. Khlopin, AS USSR)

Card 3/3

SOV/AB-22-7-16,26

AUTHORS: Lebedev, M. I., Silant'yev, A. M., Yutlandov, I. A.

TITLE: γ -Spectrum of Lu^{171} (γ -Spektr Lu^{171})

PERIODICAL: Izvestiya Akademii nauk SSSR, Seriya fizicheskaya, 1958, Vol. 22, Nr 7, pp. 839-840 (USSR)

ABSTRACT: The isotope Lu^{171} was produced by the irradiation of a tantalum target with fast protons. Then the rare earths were separated from the tantalum target by chemical methods. Lu was separated from the rare earths by chromatographic methods. The main activity of the preparation originates from Lu^{169} , ^{170}Lu . Lu^{169} is transformed into Yb^{169} by the decay. Yb^{169} , on the other hand, decays with a half-life of 30 days into Tm^{169} . The half-life of Lu^{169} , and Lu^{170} is about 2 days. In order to purify Lu from these isotopes it was stored for about one month and then purified chromatographically from Yb. This preparation essentially only contained Lu which exhibited a half-life of about 8 days. Almost no radioactive substances with another half-life were contained in the preparation. The γ -spectrum of the preparation was investigated by means of a scintillation spectrometer. The spectrum obtained was decomposed into com-

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γ -Spectrum of Lu¹⁷¹

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ponents according to the method proposed by D. Maeder (Mader) (Ref 7). The lines at 450 and 550 keV are within the range of the Compton "tail" (khvost) of the strong γ -lines at 650 and 730 keV. The γ -line at 75 keV is located in the decreasing part of the strong line of the characteristic radiation. In the measurement of the soft γ -radiation by means of the scintillation spectrometer two peaks were obtained in the output: One main peak corresponding to the energy of the incident γ -radiation and a side-peak which is shifted towards small energies with respect to the main peak. It was found that the relative intensities of the γ -radiation at 65, 75, 8, 90, 6 and 181, 7 keV well agree with the values computed in references 4 and 5. The investigation was performed in the laboratory of G. V. Gorshkov. A. N. Murin made available the Lu-preparation. There are 1 figure, 1 table, and 9 references, 7 of which are Soviet.

ASSOCIATION: Radiyevyy institut im. V.G.Khlopina Akademii nauk SSSR
(Radium Institute imeni V.G. Khlopina, AS USSR)

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SOV/48-22-7-19/26

AUTHORS: Grigor'ev, O. I., Kuznetsov, B. S., Shimanakaya, N. E.,
Yutlandov, I. A.

TITLE: Determination of the Ratio L/K in Dy¹⁵⁹ and Er¹⁶⁵ and an
Estimation of the Transmutation Energies of Dy¹⁵⁹ → Tb¹⁵⁹
and Er¹⁶⁵ → Ho¹⁶⁵ (Opredeleniye otnosheniya L/K dlya
Dy¹⁵⁹ i Er¹⁶⁵ i otsenka energii perekhodov Dy¹⁵⁹ → Tb¹⁵⁹
i Er¹⁶⁵ → Ho¹⁶⁵)

PERIODICAL: Izvestiya Akademii nauk SSSR, Seriya fizicheskaya, 1958,
Vol. 22, Nr 7, pp. 850-860 (USSR)

ABSTRACT: The decay energy ϵ_0 of radioactive isotopes, which are sub-
jected to an electron capture can be determined by 5 different
methods. They are described. From the evidence given it is
concluded, that the 5th method, that utilizing the ratio L/K
is very convenient in the determination of small transmutation
energies (< 200 keV) in isotopes with a relatively simple
decay scheme, which do not exhibit a considerable converting
cascade γ -radiation. The application of this method is limit-
ed by the imperfections still inherent in the modern theory

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SOV/48-22-7-19/26

Determination of the Ratio L/K in Dy^{159} and Er^{165} and an Estimation of the Transmutation Energies of $Dy^{159} \rightarrow Tb^{159}$ and $Er^{165} \rightarrow Ho^{165}$

of K-capture and by the incomplete knowledge of the qualitative and quantitative rules governing the processes of the rearrangement of the electron shell of the atom. L/K was determined for two isotopes of rare earths, Dy^{159} and Er^{165} , both having a neutron deficit. Proceeding from the results the transmutation energies of the processes $Dy^{159} \rightarrow Tb^{159}$ and $Er^{165} \rightarrow Ho^{165}$ were estimated. A γ -spectrometer combined with a proportional counter was used for measuring the energies and the intensities of an X-ray K- and L-radiation. The proportional counter (Ref 20) permitted to measure the γ - and X-ray radiation of small energies, which is quite impossible with other methods. The proportional counter with a cylindrical aluminum cathode and its circuit diagram is described. The recording power of the counter for γ - and X-ray-radiation of varying energy is computed according to the known absorption coefficients for this radiation in argon and beryllium (Ref 22), taking into account the geometry of the experimental arrangement. The electronic circuit diagram

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SOV/48-22-7-19/26

Determination of the Ratio L/K in Dy¹⁵⁹ and Er¹⁶⁵ and an Estimation of the Transmutation Energies of Dy¹⁵⁹ → Tb¹⁵⁹ and Er¹⁶⁵ → Ho¹⁶⁵

and the calibration of the device is described. The Dy¹⁵⁹ source was obtained from a tantalum target, which was irradiated in the synchrocyclotron of the "United Institute of Nuclear Research" with 660 MeV protons. The ratio L/K was computed according to formula (3). It is shown that the transition Dy¹⁵⁹ → Tb¹⁵⁹ must be classified as being superforbidden. Marshak's formula was used, giving an energy value of 79^{+10}_{-5} keV for this transition. The lowest level of Tb¹⁵⁹ at 57 keV is apparently not excited in the decay of Dy¹⁵⁹. An estimation of the quantity ft on the basis of the decay energy of 79 keV and a half-life of 136 days furnishes a value for lg ft of about 6.2. According to the classification of King (Ref 32) this value agrees with the assumption, that this transmutation is a superforbidden one.

The Er¹⁶⁵-sources were also obtained from tantalum irradiated with fast protons ($E_0 = 660$ MeV). The X-ray radiation

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SOV/48-22-7-19/26

Determination of the Ratio L/K in Dy^{159} and Er^{165} and an Estimation of the
Transmutation Energies of $Dy^{159} \longrightarrow Tb^{159}$ and $Er^{165} \longrightarrow Ho^{165}$

of a series of tantalum targets irradiated for different periods was measured. The ratio I_L/I_K (for the intensities of these radiations) was equal to 0,40. From this value for L/K a result of $1,2 \pm 0,4$ was obtained. Using Marshak's formula and the experimentally found value of L/K (Er^{165}) 82^{+10}_{-5} keV were found for the transmutation energy of the process $Er^{165} \longrightarrow Ho^{165}$. The value of $lg ft$ was 3,1 with a half-life of 10,5 hours, which is in agreement with the permitted character of the transmutation. There are 9 figures, 1 table, and 35 references, 3 of which are Soviet.

ASSOCIATION: Radiyevyy institut im. V. G. Khlopina Akademii nauk SSSR
(Radium Institute imeni V. G. Khlopin, AS USSR)

Card 4/4

YUTLANDOV, I. A.

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8109/2130

24.6410
AUTHORS:

Abdurazakov, A. A.; Gromov, E. Ya.; Dzhelapov, H. B.,
Umarov, G. Ya., Yutlandov, I. A.

TITLE:

Conversion electron spectra of neutron-deficient thulium isotopes

SOURCE:

Tashkenteskaya konferentsiya po mirnoy ispol'zovaniyu atomnoy energii. Tashkent, 1959. Trudy. v. 1. Tashkent, 1961, 259-262

TEXT: A study was made of the conversion electron spectra of thulium obtained by 660-Mev proton bombardment of tantalum. The spectra were recorded on a beta-spectrograph in uniform magnetic field. The three exposure times were 9 hrs, 14.5 hrs, and 20 hrs. Conversion lines of Tu^{165} , Tu^{166} , and Tu^{167} were observed. Besides this a number of new lines were found (Table 2) which are due to a thulium isotope with a half-life of less than 7 hrs. According to Mihelich et al. (Refs. 2, 3, see below) this isotope might be Tu^{165} with a half-life of 2 hrs. Preliminary experiments on a magnetic spectrometer with a Geiger counter seem to

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Conversion electron spectra ...

confirm this assumption since several of the conversion electron lines observed (156, 203.4, 94.7, 99.4, 102.4, and 133 keV) are appropriate for a half-life of 2 hrs. V. G. Chuzin, I. S. Dneprovskiy, L. N. Ignatyuk, and A. A. Balishev are thanked for help and advice. There are 1 figure, 2 tables, and 3 references: 1 Soviet and 2 non-Soviet. The reference to the English-language publications read as follows: Ref. 2: Mihelich I. W. et al. Phys. Rev., 108, 909, 1957; Ref. 3: Mihelich I. W. et al. Phys. Rev., 108, 909, 1957.

ASSOCIATION: Sredneasiatskiy politekhnicheskii institut (Novel Central Asia Polytechnic Institute)

Table 2. New conversion electron lines from thulium isotopes.
Legend: (1) conversion lines; gamma transition energies whose identification is not completely reliable are given in parentheses.

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Conversion electron lines		Energy (keV)	
Isotope	Line	Energy (keV)	Energy (keV)
Tm 167	K	101.33	747.0
	L ₁	115.13	840.0
	L ₂	115.13	840.0
	L ₃	115.13	840.0
Tm 169	K	101.33	747.0
	L ₁	115.13	840.0
	L ₂	115.13	840.0
	L ₃	115.13	840.0
Tm 171	K	101.33	747.0
	L ₁	115.13	840.0
	L ₂	115.13	840.0
	L ₃	115.13	840.0
Tm 173	K	101.33	747.0
	L ₁	115.13	840.0
	L ₂	115.13	840.0
	L ₃	115.13	840.0
Tm 175	K	101.33	747.0
	L ₁	115.13	840.0
	L ₂	115.13	840.0
	L ₃	115.13	840.0
Tm 177	K	101.33	747.0
	L ₁	115.13	840.0
	L ₂	115.13	840.0
	L ₃	115.13	840.0
Tm 179	K	101.33	747.0
	L ₁	115.13	840.0
	L ₂	115.13	840.0
	L ₃	115.13	840.0
Tm 181	K	101.33	747.0
	L ₁	115.13	840.0
	L ₂	115.13	840.0
	L ₃	115.13	840.0
Tm 183	K	101.33	747.0
	L ₁	115.13	840.0
	L ₂	115.13	840.0
	L ₃	115.13	840.0
Tm 185	K	101.33	747.0
	L ₁	115.13	840.0
	L ₂	115.13	840.0
	L ₃	115.13	840.0
Tm 187	K	101.33	747.0
	L ₁	115.13	840.0
	L ₂	115.13	840.0
	L ₃	115.13	840.0
Tm 189	K	101.33	747.0
	L ₁	115.13	840.0
	L ₂	115.13	840.0
	L ₃	115.13	840.0
Tm 191	K	101.33	747.0
	L ₁	115.13	840.0
	L ₂	115.13	840.0
	L ₃	115.13	840.0
Tm 193	K	101.33	747.0
	L ₁	115.13	840.0
	L ₂	115.13	840.0
	L ₃	115.13	840.0
Tm 195	K	101.33	747.0
	L ₁	115.13	840.0
	L ₂	115.13	840.0
	L ₃	115.13	840.0
Tm 197	K	101.33	747.0
	L ₁	115.13	840.0
	L ₂	115.13	840.0
	L ₃	115.13	840.0
Tm 199	K	101.33	747.0
	L ₁	115.13	840.0
	L ₂	115.13	840.0
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Tm 323	K	101.33	747.0
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YUTLANDOV, I-A

PHASE I BOOK EXPLOITATION SOV/5404

Murin, A. N., V. D. Nefedov, and V. P. Shvedov, eds.

Radiokhimiya i khimiya yadernykh protsessov (Radiochemistry and the Chemistry of Nuclear Processes) Leningrad, Goskhimizdat, 1960. 784 p. Errata slip inserted. 13,000 copies printed.

Ed.: F. Yu. Rachinskiy; Tech. Ed.: Ye. Ya. Erlikh.

PURPOSE : This textbook is intended for students of physical chemistry or radiochemistry at universities and schools of higher education. It may also serve as a handbook for scientific workers and technical personnel in the radiochemical industries and other related branches.

COVERAGE: The textbook deals with problems in modern radiochemistry, including adsorption, cocrystallization, isotope exchange in radioactive elements, the chemistry of nuclear processes, and methods of preparing radioactive isotopes and labeled compounds. Special attention has been given to chemical processes caused by radioactive transformations and radiation. In the main the book was compiled by person-

Card 3/16

Radiochemistry and the Chemistry (Cont.)

SOV/5404

nel of the Radiochemistry Department, Leningradskiy gosudarstvennyy universitet imeni A. A. Zhdanova (Leningrad State University imeni A. A. Zhdanov), and the Department of the Technology of Artificial Radioactive Isotopes, Leningradskiy tekhnologicheskii institut imeni Lensovet (Leningrad Technological Institute imeni Lensovet). No personalities are mentioned. References accompany individual chapters.

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Ch. I. Distribution of Substances Between the Solid Crystalline and the Liquid Phases. L. L. Makarov, V. D. Nefedov, and Ye. N. Tekster

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Radiochemistry and the Chemistry (Cont.)

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I. A. Yutlandov

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Labeled Compounds. I. P. Tupitsyn

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Card 13/16

P/046/60/005/011/014/018
D249/D303

AUTHORS: Chojnacki, S., Kopystyński, J., Preibisz, Z.,
Sosnowski, R., Yutlandov, I. (Dubna -- USSR), and
Żylicz, J.

TITLE: β^+ radiation of ^{140}Pr

PERIODICAL: Nukleonika, v. 5, no. 11, 1960, 788

TEXT: (Abstract - Report No. 148/I A (IBJ - Institute of Nuclear Research, PAS)): The spectrum of positrons emitted by ^{140}Pr was investigated using a long lens magnetic β -ray spectrometer. Helical baffles were used to separate positrons and electrons. The maximum energies of the three β^+ components are 2366 ± 12 keV : 770 ± 12 keV : 485 ± 15 keV; their relative intensities are: $1 : < 1.4 \times 10^{-2} : 7.2 \times 10^{-6}$. [Abstractor's note: Complete translation].

Card 1/1

CHOJNACKI, S.; JASINSKI, A.; KUSCH, W.; KOWNACKI, J.; LANCZAN, H.;
YUTLANDOV, J.A.

γ spectra of ^{165}Tm and ^{167}Tm . Bul. Ac. Pol. mat. 8 no.6:407-411 '60.
(EPAI 10:6)

1. Institute of Nuclear Research, Polish Academy of Sciences.
Presented by H. Niewodniczanski.
(Gamma ray spectrometry) (Thulium)



DALKHUSHEV, B.; LEVENBERG, I.Yu.; MORIN, A.N.; NORSKYEV, Yu.T.; POKROVSKIY,
V.P.; YUTLANDOV, I.A.

Radioactive decay series $\text{Ib}^{164} \rightarrow \text{Tu}^{164} \rightarrow \text{Ir}^{164}$. Inv.AN
SSSR.Ser.fiz. 24 no.9:1105-1108 S '60. (MIRA 13:9)
(Ytterbium--Decay)

LEVENBERG, I.; POKROVSKIY, V.; TARASOVA, L.; YUTLANDOV, I.

The (p, pn) and (p, n) reactions on Sc^{45} induced by high-energy protons. Dubna, Ob"edinennyyi in-t iadernykh issledovaniy, 1961. 8 p.

(No subject heading)

YUTLANDOV, I

4

P/045/61/020/012/004/004
B137/B104

AUTHORS: Chojnacki, B., Kopystyński, J., Preibisz, Z., Sosnowski, R.,
Zylicz, J., and Yutlandov, I.

TITLE: Note on positron radiation from Pr^{140}

PERIODICAL: Acta Physica Polonica, v. 20, no. 12, 1961, 1021 - 1023

TEXT: In their letter to the editor the authors report on an investigation of the positron spectrum of Pr^{140} . Measurements were made with a long-lens spectrometer in which helical baffles were applied to separate positron and electron radiations. The Pr^{140} isotope was obtained from a neodymium fraction separated from a tantalum target by the chromatographic method. The target was irradiated with 660-Mev protons (synchrocyclotron of the Joint Institute of Nuclear Research at Dubna). Nd^{140} contained in the Nd fraction decays into Pr^{140} by electron capture. The Kurie plot is a straight line from 350 kev up to the maximum energy of 2366 ± 24 kev. B. S. Dzhelepov (Zh. eksper. teor. fiz., 37, 857 (1959); Izv. Akad. Nauk SSSR Ser. fiz., 22, 153 (1958)); Papers presented at the Second Conference on Neutron Deficient Isotopes of the Rare Earth Elements, Joint Inst. of

Card 1/2

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4

Note on positron radiation from Pr ¹⁴⁰

P/045/61/020/012/044/064
D137/B104

Nuclear Research, Dubna (1959)) is mentioned. There are 1 figure, 1 table, and 10 references: 6 Soviet-bloc and 4 non-Soviet-bloc. The three references to English-language publications read as follows: Browne, C. J., Rasmussen, J. O., Surls, J. P., and Martin, D. F., Phys. Rev., 85, 146 (1952); Cameron, A. G. W., Canad. J. Phys., 35, 1021 (1957); Levy, H. H., Phys. Rev., 106, 1265 (1957).

ASSOCIATION: Institute of Experimental Physics, Warsaw University, Warsaw (Chojnacki, Kopystyński). Institute of Nuclear Research, Polish Academy of Sciences, Warsaw (Preibisz, Sosnowski, Zylicz). Joint Institute of Nuclear Research, Dubna, USSR (Yutlandov)

SUBMITTED: June 1, 1961

Card 2/2

LEVENBERG, I.; POKROVSKIY, V.; YUTLANDOV, I.; SARANTSEVA, V.R.,
tekhn. red.

[Simple nuclear reactions on Ca^{48} induced by high-energy protons]
Prostye iadernye reaktsii na Ca^{48} pod deistviem protonov vysokikh
energii. Dubna, Ob"edinennyi in-t iadernykh issl., 1962. 9 p.
(MIRA 15:6)

(Nuclear reactions) (Calcium—Isotopes) (Protons)

S/056/62/043/005/009/058
B102/B104

AUTHORS: Levenberg, I., Pokrovskiy, V., Yutlandov, I.

TITLE: Simple Ca^{48} nuclear reactions induced by high-energy protons

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 43,
no. 5(11), 1962, 1619-1624

TEXT: To help explain why the measured cross sections of simple nuclear reactions on complex nuclei differ so much from those calculated by Serber's theory those of the (p,pn), (p,2n) and (p,n) reactions on $^{20}\text{Ca}^{48}$ were measured. The target, a CaCO_3 tablet $15 \cdot 5 \cdot 1.5 \text{ mm}^3$ (natural isotope composition), was bombarded by protons of 120 - 660 Mev from the synchrocyclotron of the OIYal for 15 - 20 min. It was enclosed by three aluminum foils (20μ) so that the proton beam intensity could be measured from the yield of the $\text{Al}^{27}(\text{p},\text{pn})\text{Na}^{24}$ reactions occurring in the jacket. The fractions of the final reaction products (Na^{24} , Ca^{47} , Sc^{47} , Sc^{48}) were separated by chemical means and their activity was measured with a NaI(Tl) Card 1/4

Simple Ca^{40} nuclear reactions ...

S/056/62/043/005/009/058
B102/B104

scintillation γ -spectrometer and a 128-channel AMA-3C (AMA-3s) analyzer. Secondary neutrons were found to contribute only negligibly to the reactions examined. The results from 2 - 3 series of measurements with a root-mean-square error of about 15% are given in Table 2. On comparing these cross sections with those of heavier nuclei, the ratio $\sigma_{p,2n}/\sigma_{p,n}$ was found to be almost independent of E_p (for $E_p \gg 100$ Mev) and highly dependent on A, whereas the ratio $\sigma_{p,pn}/\sigma_{p,n}$ did not depend on A but increased rapidly with E_p . Conclusions: The (p,n) and (p,2n) reactions are direct interactions between protons and peripheral nuclear neutrons. The mechanism of (p,n) and that of the first stage of (p,2n) are identical. Not less than 95% of the (p,pn) reactions are knock-out reactions, not only for $E_p > 1$ Bev (Phys. Rev. 119, 324, 1960) but also at proton energies of the order of 100 Mev. There are 3 figures and 2 tables.

ASSOCIATION: Ob'yedinennyy institut yadernykh issledovaniy (Joint Institute of Nuclear Research)

SUBMITTED: June 6, 1962
Card 2/4

Simple Ca^{48} nuclear reactions ...

8/056/62/043/005/009/058
B102/B104

Table 2. Reaction cross sections in millibarns.

Fig. 1. Excitation curves for Ca^{48} .

	$E_p = 120$	200	300	400	500	600	660
(p, pn)	118 ± 2	106 ± 10	106 ± 4	101 ± 4	104 ± 1	110 ± 8	110 ± 2
$(p, 2n)$	20.3 ± 1.6	18.6 ± 0.6	11.0 ± 0.1	8.7 ± 0.3	8.7 ± 0.1	6.2 ± 1.0	5.7 ± 0.3
(p, n)	7.8 ± 0.3	4.7 ± 1.2	4.1 ± 0.3	3.6 ± 0.1	3.9 ± 0.2	2.2 ± 0.2	2.6 ± 0.1
$\text{Al}^{27}(p, 3pn)$	10.2	9.1	11.0	11.3	11.1	11.0	10.9

Table 2

Card 3/4

Simple Ca^{48} nuclear reactions ...

S/056/62/043/005/009/058
B102/B104

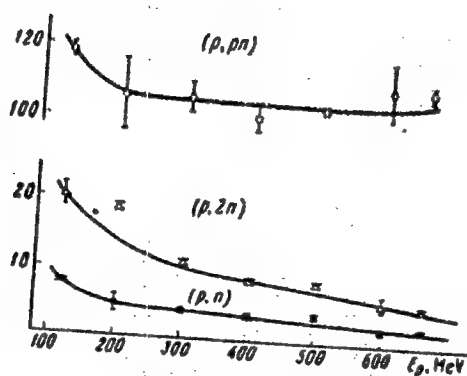


Fig. 1

Card 4/4

MURIN, A.N.; TOMILOV, S.B.; YUTLANDOV, I.A.

Separation and identification of products obtained in the spallation
of germanium with high energy protons. Vest. LGU 19 no.4:105-110
'64. (MIRA 17:3)

ACCESSION NR: AP4031174

S/0056/64/046/004/1475/1476

AUTHOR: Jen, Te-hou; Levenberg, I.; Pokrovskiy, V.; Tarasova, L.; Yutlandov, I.

TITLE: The reactions (p, pn) and (p, n) on Sc-45 under the influence of high-energy protons.

SOURCE: Zh. eksper. i teor. fiz., v. 46, no. 4, 1964, 1475-1476

TOPIC TAGS: (p, pn) reaction, (p, n) reaction, scandium 45, high energy protons, scandium isomer, reaction cross section, nuclear structure, np scattering cross section, differential cross section

ABSTRACT: This is a continuation of earlier experiments (ZhETF v. 43, 1619, 1963) on radiochemical studies of simple nuclear reactions with bombarding proton energies close to several hundred MeV. The results are listed in the table, which shows for comparison similar results on calcium. The new data confirm the assumption made in the first study that the direct knock-on mechanism begins to predominate in the (p, pn) reaction already at energies close to several hundred MeV. Calculation of the ratio of the cross sections for isomer pro-

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ACCESSION NR: AP4031174

duction in this reaction offers further proof of this hypothesis. It is concluded that only neutrons from the uppermost completely or partially filled level participate in the (p, n) reaction, which comprises quasielastic scattering of the proton on the neutron of the nucleus, which carries away most of the energy. Orig. art. has: 1 figure and 1 table.

ASSOCIATION: Ob'yedinenny'y institut yadernykh issledovaniy
(Joint Institute of Nuclear Research)

SUBMITTED: 10Jul63

DATE ACQ: 07May64

ENCL: 02

SUB CODE: PH

NO REF SOV: 001

OTHER: 003

Card 2/42

YUTLANDOV, S.G.

Rare manuscripts on medicine. Sov.zdrav. 17 no.4:63 Ap'58 (MIRA 11:5)
(MEDICINE)
(MANUSCRIPTS, ARABIC)

VASIL'YEV, Yu.S.; YUTROV, A.P.

Investigation of PK-2K ovens with all wide regenerators. Koks
1 khim. no.1:30-33 '62. (MIRA 15#2)

1. Ukrainskiy uglekhimicheskiy institut (for Vasil'yev).
2. Gosudarstvennyy inatitut po proyektirovaniyu predpriyatiy
koksokhimicheskoy promyshlennosti (for Yutrov).
(Coke ovens)

YUTSEVICH, K.

Legendary hero and regimental commander. Voen.znan. 31 no.6:
14-15 Ja '61. (BIRA 14:6)

1. Byvshiy nachal'nik shtaba kavaleriyskoy brigady Kotovskogo.
(Kotovskii, Grigorii Ivanovich, 1881-1925)

USSR / Human and Animal Physiology: Nervous System, Higher Nervous T
Activity, Behavior.

Abs Jour : Ref Zhur - Biol., No 15, 1958, No. 70557

Author : Yutsevich, Ye. O.
Inst : Scientific Research Institute of Psychology Ukrainian SSR
Title : Certain Problems of High-Frequency Tone Analysis

Orig Pub : Nauk. zap. Nauk. dosl. in-t psikhol. URSR, 1956, Vol 4,
91-105

Abstract : A discussion is made of the "comparative" method of high-frequency tone analysis (comparison of graphic or visual recording of free intonation by the experimental subject of assigned intervals with a definite high-frequency tone scale), its shortcomings, and its use by various authors (N. A. Garbuzov, A. V. Rabinovich, et al.). Emphasis is given to the necessity, in experiments on high-frequency analysis, of preserving the normal conditions of execution,

Card 1/2

YUTSEVICH, Yu. K.

AID P - 4642

Subject : USSR/Aeronautics - Photography

Card 1/1 Pub. 135 - 8/26

Author : Yutsevich, Yu. K., Eng.-Col.

Title : Aerial photography at night

Periodical : Vest. vozd. flota, 5, 39-45, My 1956

Abstract : The author discusses the problems of exact dropping of flare bombs during night photography and makes some conclusions. Two sketches, 2 graphs, 4 tables. The article is of interest.

Institution : None

Submitted : No date

YUTSOVICH, Ernest [Jucovic, Ernest]

Remarks on the edges of a K-polyhedron. Mat fiz cas SAV '64.
no.1:3-5 '64.

1. Department of Mathematics, Pedagogic Institute, Prusov,
Leninovo namesti 5. Submitted April 4, 1963.

GONCHAROV, Aleksandr Dmitriyevich; YUZHASHEV, V.G., red.; RAKITIN,
I.T., tekhn. red.

[Promoter of progress; electricity in agriculture] Dvigatel'
progressa; elektrichestvo v sel'skom khoziaistve. Moskva,
Izd-vo "Znanie," 1963. 31 p. (Novos v zhizni, nauka,
tekhnika. III Seriya: Ekonomika, no.6) (MIRA 16:4)
(Electricity in agriculture)

YUTSIS, A. P.

POLAND/Mathematics - Applied
Spectroscopy
Physics

Jan 1947

"Self-consistent Field with Exchange for the
Configurations $1s^2 2s 2p^3$ and $1s^2 2p^4$ of Carbon,"
A. Jucys, Vilna State University, 6 pp
YUTSIS

"Journal of Physics" Vol XI, No 1

The mathematical expressions and their solutions
are given for the energies of the $(2s) (2p)$ shell,
according to Slater and Fock. Large tables of
numerical data are given.

BS

26172

1766. Interaction of configurations in the carbon atom. A. P. Yutsis. Zhur. Eksp. i Teoret. Fiz. 19, 565-76(1949) July (in Russian)

Interactions of the following configurations of the carbon atom are theoretically discussed: $1s^2 2s^2$, $1s^2 2s^2 2p^3 p$, and $1s^2 2s^2 2p^2 3s$. Wave functions of the atom in these configurations are given. With the aid of one-electron wave functions, calculated by the method of a self-consistent field without quantum exchanges, a computation is made of the energy-matrix elements, both diagonal and joining different configurations of the same valency, and a solution is given of the secular equations of every term of the configurations.

414-364 METALLURGICAL LITERATURE CLASSIFICATION

197197	USSR/Nuclear Physics - Beryllium Atoms	Oct 51
	"Interaction of Configurations in Beryllium-Type Atoms," A. P. Yutsis, V. I. Khabachenko, Leningrad Univ. Acad Sci USSR	
	"Zhur-Khner 1 Teoret Fiz" Vol XXI, No 10, pp 1139-1145	
	Computes effect of interaction of configurations in energy of basic configuration of iso-electron atoms Li^+ , Be , B^+ , C^{+2} , N^{+3} and O^{+4} and compares results with exptl data. Discusses stability of neg ions of alkali metals (cf. V. A. Pok and M. I. Petrashen, ibid. 6, 1, 1936; Morse, Young and	
197197	USSR/Nuclear Physics - Beryllium Atoms (Contd)	Oct 51
	Kaulvitz, Phys Rev, 48, 948, 1935). Authors acknowledge advice of Acad V. A. Pok and M. G. Ve-	
	nelov. Submitted 27 Nov 50.	
197197		

YUTSIS, A. P.

Approximate computation

Fok's equations in a multiconfiguration approximation. Zhur. eksp. i teor. fiz 23 no., 2 1952

Monthly List of Russian Accessions, Library of Congress, December 1952. Unclassified

USSR.

Generalization of the theory of the partial separation of variables in the case of multivalent atoms. A. P. Yutsis, *Zhur. Eksp. i Teor. Fiz.* 23, 371-90 (1952); *Soviet Phys. JETP*, 56A, 466 (1952).—A linear combination of determinants, expressing the wave function of the whole atom, is transformed by means of the Laplace theorem in such a manner that the quantum nos. of the inner electrons are found in the minors of the determinants, and the quantum nos. of the valence electrons in their algebraic complements. The total energy of the atom is expressed with the help of the wave function of the whole atom modified in this manner. The general expression obtained is identical to the case in which the partial separation of variables is used. The method is applied to the calculation of the energy levels of the Li^{+} ion.

PA 236T72

USSR/Nuclear Physics - Be Atom

Ikry 52

"Self-Conforming Fok's Field for Configuration
 $1s^2 2p^2$ of Beryllium," A. P. Yutsis and G. K.
Tsyunaytis, Vilno State Univ

"Zhur Eksper i Teoret Fiz" Vol 23, No 5, pp 512-
516

Solves Fok's equation for the configuration
 $1s^2 2p^2$ of Be atom. Standardized solutions are
presented in form of tables and the latter is
used to evaluate energies. Results are estimated
to be better than those obtained by means of wave
functions. Received 5 Jun 52.

236T72

YUTSIS, A. P.

236T73

USSR/Nuclear Physics - Atomic Terms Nov 52

"Triplet Splitting of Atomic Terms With Bivalent 2p-Electrons," A. P. Yutis, V. K. Smugurov, and G. K. Tsyumaytis, Vilno State Univ

"Zhur Ekeper 1 Teoret Fiz" Vol 23, No 5, pp 517-520

Determined triplet splitting of atoms of Be type in configuration $2p^2$ and Be type in $1s2p^2$ by means of analytic wave functions. Triplet splitting of Be atom in $1s2p^2$ and also splitting of

236T73

basic configuration of neutral C atom and doubly ionized O atom are determined by single electron wave functions, constituting solutions of equations of self-conforming Fok's field. Received 21 Jul 52.

236T73

USSR

539.153

4854. The triplet splitting of terms of the carbon atom
in configuration $1s^2 2s^2 2p^2$. V. K. SAUKHAROV, Yu. L.
VIZNAROVA AND A. P. YUNIS. *Zh. Exptl. teor. fiz.*,
24, No. 3, 255-8 (1953); in Russian.

Expressions are given for the elements of the energy
matrix of spin interaction, using the radial integral
for an atom in the $1s^2 2s^2 2p^2$ configuration. The
triplet splitting of C atom in this configuration is
determined, allowance being made for the non-
diagonal matrix elements with the use of one-electron
wave-functions of a self-consistent field without
quantum exchange. See Abstr. 7203 (1949), 3561
(1953).

E. LACHMAN

RMZ 1211

ANALYTICAL ONE-ELECTRON WAVE FUNCTIONS IN A
MULTI-CONFIGURATIONAL APPROXIMATION FOR
ATOMS OF THE TYPE OF HELIUM AND BERYLLIUM.

V. I. Kavetskiy and A. P. Yatsin. *Zhur. Eksp. i Teoret.*

Fig. 25, No. 3, 157-63 (1955). (In Russian)

Configurations are formed from products of one-electron functions, and the parameters are determined by a variational calculation. Results for energies are given for two- and three-configurational approximations. The two-configurational approximations in helium are $1s^2-2p^2$, $1s^2-2s^2$; for beryllium, $1s^2-2s^2-1s^2-2p^2$ and $1s^2-2s^2-1s^2-3d^2$. The same parameter is used in a given one-electron function in each configuration throughout a given approximate calculation. (Science Abstracts)

USSR.

Two-configuration approximation in the case of the $1s^2 2p^2$ configuration of the carbon atom. G. E. Tsyvinskii and A. P. Yuzina (State Univ., Vil'no Lithuanian S.S.R.). *Zhur. Eksp. i Teor. Fiz.* 45, 879-883 (1963); cf. C.A. 49, 26464. Solutions are obtained for the Hartree self-consistent field equation for the $1s^2 2p^2$ configuration of the C atom. Their solutions are then used to apply the two-configuration approximation $1s^2 2p^2 - 1s^2 3p^2$ to the first of these configurations. The theoretical value for the energy thus obtained for the difference of the terms ($^3P - ^1P$) of 0.206 at. units, compares well with the experimentally det'd. value of 0.007. The theoretical and exptl. values of R_{∞} are 27.438 and 27.573, resp. P. H. R.

62
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US-R

535338.133

4521. Theoretical determination of the isotope shift in the spectrum of the carbon atom. A. P. YERMA, A. S. NARONOVICH and G. R. TSVETKOV. Zh. ekspt. teor. fiz., 25, No. 6(12), 611-7 (1953) In Russian.

An expression is derived for the specific shift for the configuration $1s^2 2s^2 2p^k$ ($k = 1, 2$) for the carbon atom, in the 2-configurational approximation $1s^2 2s^2 2p^k \rightarrow 1s^2 2s^2 1s^2$. With the aid of one-electron self-consistent Hartree wave functions the isotope shift for the transition $1s^2 2s^2 2p^k \rightarrow 1s^2 2s^2 1s^2$ is calculated both in the 1- and 2-configurational approximations. The shift is smaller in the latter case, the decrease for the $^3P - ^3S$ transition being about 10 times greater than for $^3P - ^1D$ or $^1P - ^1S$. The experimental value for $^3P - ^3S$ lies between the 1- and 2-configurational approximations, several times nearer the latter.

W. J. SWANICK

Am2 254

Yutsis, A.P.

Category : USSR/Atomic and Molecular Physics - Physics of the Atom

D-1

Abs Jour : Ref Zhur - Fizika, No 2, 1957 No 3361

Author : Vanagas, V.V., Glembofskiy, I.I., Yutsis, A.P.

Title : The Fok Self-Consistent Field for the Positive Ion of Carbon.

Orig Pub : Tr. AN Lit SSR, 1955, B3, 3-7

Abstract : Solutions are given for the Fok self-consistent field equations for the configuration (K) $1s^2 2s^2 2p$ C^+ . The solution was brought to a degree of self-consistency $\eta = 0.0025$ (Yutsis A.P., Yunaytis G.K., Zh. eksperim. i teor. fiziki, 1952, 23, 512). The corresponding radial single-electron functions were tabulated. The calculated value of the energy is -37.317 atomic units. The interaction between K $1s^2 2s^2 2p$ and $1s^2 2p^3$ was next calculated, leading to a reduction in energy by -0.041 atomic units. The total energy calculated in this manner for the C^+ ion is -37.358 atomic units and differs from the experimental value (-37.441 atomic units) by 0.2%. In the opinion of the author, an additional reduction in the calculated value of the energy of C^+ by 0.004 atomic units could be obtained by using for K $1s^2 2p^3$ the self-consistent single-electron functions corresponding to this K.

Card : 1/1

YUTSIS, A. P.

USSR/Physical Chemistry - Atom, B-3

Abst Journal: Referat Zhur - Khimiya, No 19, 1956, 60695

Author: Batarunas, I. V., Kavetskis, V. I., Yutis, A. P.

Institution: None

Title: Three-Configurational Approximation in the Case of Atoms of the Beryllium Type

Original Periodical: Tr. AN LitSSR, 1955, B3, 9-16; Lithuanian resumé

Abstract: Three-configurational approximations $1s^2s^2 - 1s^2p^2 - 2s^2p^2$ (abbreviated 1-2-3) is applied to primary state of atoms Be, B and C². For configuration 1 are utilized self-coordinated wave functions (Referat Zhur - Khimiya, 1956, 9001). For configurations 2 and 3 included in wave function of primary state as small corrections are utilized analytical hydrogen-like wave functions:
 $P(1s/r) = 2\alpha^{3/2} r \exp(-\alpha r)$, $P(2s/r) = \sqrt{12\alpha^5} / (\alpha^2 - \alpha\beta + \beta^2)^{1/2} \times$
 $r \{1 - [(\alpha + \beta)/3]r\} \exp(-\beta r)$, $P(2p/r) = (4/3\beta^5)^{1/2} r^2 \times \exp(-\gamma_1 r)$.
 Utilized are α and β determined at one-configurational approximation

Card 1/3

USSR/Physical Chemistry - Atom, B-3

Abst Journal: Referat Zhur - Khimiya, No 19, 1956, 60695

Abstract: for the primary state (Fok, V. A., Petrashen', M. I., Zh. eksperim. i teor. fiziki, 1936, 6, 1). For determination of parameters γ_2 and γ_3 the 3-configurational approximation is divided into 2 2-configurational approximations: 1-2 and 1-3. Values γ_2 were in part determined before (Referat Zhur - Khimiya, 1955, 8971). In the paper are tabulated the values of parameters contained in the above state one-electron functions and is also tabulated the function $P(2p/r)$ for B. Taking into account the interaction of configurations 1-2-3 the complete 4-electron wave function is represented in the form $\sqrt{(1+a_{12})^2(1+a_{13})^2}^{-1/2} \psi(2s^2/x_1, x_2) + a_{12} \psi(2p^2/x_1, x_2) / \sqrt{\psi(1s^2/x_3, x_4) + a_{13} \psi(2p^2/x_3, x_4)}$ shows that interaction of configuration reduces itself in this case to a utilization of 2-electron wave functions (to an incomplete separation of variables). Values of energy of primary state in the isoelectronic series Be, B⁺ and C²⁺ (in atomic units): calculated by the usual method of self-coordinated field of Fok, are -14.577; -24.238; -36.406; calculated at 3-configurational approximation utilizing for configurations 2 and 3 the analytical functions -14.638; -24.314; -36.496; calculated by solving simplified

Card 2/3

USSR/Physical Chemistry - Atom, B-3

Abst Journal: Referat Zhur - Khimiya, No 19, 1956, 60695

Abstract: equations of Fok at individual 2-configurational approximations with correction for 3-configurational approximation -14.640; -24.316; (-36.498, this value was not calculated but estimated); the experimental values are: -14.668; -24.353; -36.545.

Card 3/3

JUCYS, A. P.

USSR/Atomic and Molecular Physics - Physics of the Atom, D-1

Abst Journal: Referat Zhur - Fizika, No 12, 1956, 34260

Author: Batarunas, J., Kaveckis, V., Jucys, A.

Institution: None

Title: Application of the Method of the Incomplete Separation of Variables to the Helium-Type Atoms

Original Periodical: Darbai Fizikos-techn. inst. Lietuvos TSR Mokslu Akad., 1955, 1, 25-33; Lithuanian; Russian resumé

Abstract: The work is devoted to the application of the method of incomplete separation of variables, the theory of which was given by V. A. Fok, M. P. Veselov, and M. I. Petroschen' (Zhur. eksper. i teoret. fiziki, 1940, 10, 723) to the basic configuration of helium-type atoms with the aid of the numerical wave functions of the self-consistent field. The numerical calculations were carried out with the aid of solutions of the equations for the self-consistent field. The results for 6 atoms (ions) of the helium type, starting with H^- and ending with C^{4+} , are given in a table.

1 of 1

- 1 -

~~YUTSIS, A.P.~~ YUTSIS, A.P.

GIUNAITIS, G.K.; JUCIS A.P.

(TS)

A two-configurational approximation of the two lowest configurations of boron atoms. Zhur. eksp. i teor. fiz. 28 no.4:452-457 Ap '55.
(MLFA B:6)

1. Vil'nyuskiy gosudarstvennyy universitet, Fiziko-tekhnicheskiy
institut Akademii nauk Litovskoy SSR.
(Quantum theory) (Boron) (Nuclear physics)

YUTSIS, A. P.

USSR/Nuclear Physics - Fok's Equations

YUTSIS, A. P.

FD-3336

Card 1/1

Pub. 146 - 8/28

Author : Glembotskiy, I. I., Kibartas, V. V., and Yutsis, A. P.

Title : Self-consistent Fok's field in two configurative approximation to Bohr's atom

Periodical : Zhur. Eksp. i Teor. Fiz., 29, No 5, 617-621, 1955

Abstract : Solutions of usual Fok's equations of the basic configuration of a neutral Bohr atom are presented and solutions of Hartree equations, completed with a configurative term, for the function $P(2p/r)$ of the configuration $1s^2 2p^3$, computed for the two configurative approximation $1s^2 2s^2 2p - 1s^2 2p^2$; also the value of total energy determined in one configurative and two configurative approximation. Function of total potential and radial possibility distribution are tabulated. Eight references.

Institution : Physico-technical Institute of the Acad. Sci. Litvian SSR, Vilno State University.

Submitted : July 12, 1954

YUTSIS, A. P.

USSR/Nuclear Physics, Fok's Equation

YUTSIS, A. P.

FD-3337

Card 1/1

Pub. 146 - 9/28

Author : Kibartas, V. V., Kavetakis, V. I., and Yutsis, A. P.

Title : Self-consistent Fok's field in three configurative approximation to the Beryllium atom

Periodical : Zhur. Eksp. i Teor. Fiz., 29, No 5, 623-628, 1955

Abstract : A practical method of self-consistent Fok's field application to multiconfigurative approximation is analyzed. A three configurative approximation $1s^2 2s^2 - 1s^2 2p^2 - 2s^2 2p^2$ is applied to the basic configuration of the beryllium atom. The function of total potential and the radial possibility distribution are presented. Six references.

Institution : Vilno State University, Vilno State Pedagogical Institute

Submitted : July 12, 1954

JUCYS, A. P.

USSR/Atomic and Molecular Physics - Physics of the Atom, D-1

Abst Journal: Referat Zhur - Fizika, No 12, 1956, 34264

Author: Jucys, A. P., Batarunas, J. V., Kaveckis, V. I.

Institution: None

Title: Many-Configuration Approximation in the Case of Atoms of the Lithium Type

Original Periodical: Lietuvos TSR mokslu akad. darbai, 1956, B2, 3-10; Lithuanian
resumé

Abstract: Starting with a model of 2-electron state, the authors suggest a method for constructing the wave functions of the entire atom in the many-configuration approximation, in which they dispense with the absolute equality of the radial single-electron wave functions with identical sets of values of the fundamental and orbital quantum numbers. In this method, the 3-configuration approximation with the aid of the analytic hydrogen-like single-electron wave functions is applicable to the 2 lower configurations of 4 atoms of the lithium-type. In the case of the lithium atom, one employs also the wave functions of the Fok self-consistent field.

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- 1 -

YUTSIS, A. P.

USSR/Atomic and Molecular Physics - Physics of the Atom, D-1

Abst Journal: Referat Zhur - Fizika, No 12, 1956, 34268

Author: Glembotskiy, I. I., Strotskite, T. D., Iucis, A. P.

Institution: None

Title: The Fok Self-Consistent Field for the Double Ion of Nitrogen

Original Periodical: Lietuvos TSR mokslu akad. darbai, 1956, B2, 11-14; Lithuanian
resumė

Abstract: Solutions of the equations of the self-consistent Fok field are given for the basic configuration of the doubly-ionized atom of N. With the aid of these solutions the total energy is determined both in the single-configuration as well as in the double-configuration approximation. The theoretical results are compared with the experimental data.

1 of 1

- 1 -

YUTSIS, A.P.

USSR/Atomic and Molecular Physics - Physics of the Atom, D-1

Abst Journal: Referat Zhur - Fizika, No 12, 1956, 34270

Author: Glembotskiy, I. I., Martishyus, I. T., Bolotin, A. B., Iucis, A. P.

Institution: None

Title: Theoretical Determination of the Fine Structure of Atoms of the Boron Type

Original Periodical: Lietuvos TSR Mokslu akad. darbai, 1956, B2, 15-19, Lithuanian
resumé

Abstract: The doublet splitting of the terms of 4 atoms of the boron type is determined in the principal configurations both with the aid of the single-electron wave functions of the Fok self-consistent field, as well as with the aid of the analytic wave function. The theoretical results are compared with the experimental data.

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- 1 -

YUTSIS, A.P.

USSR/Atomic and Molecular Physics - Atomic Physics

D-1

Abs Jour : Ref Zhur - Fizika, No 4, 1957, No 8926

Author : Stretskite, T.D., Glembofskiy, I.I., Yutsis, A.P.

Inst : Vil'nius University

Title : The Fock Self-Consistent Field for the Positive Ion of Nitrogen

Orig Pub : Tr. AN Lit. SSR, 1956, B3, 3-10

Abstract : The equations of the Fock self-consistent field are solved for a singly ionized atom of nitrogen. To construct the initial wave functions the authors employ the differences between the functions of the different states of neighboring atoms. The values of the total energy in the one and two configuration approximation are determined. The latter approximation improves the theoretical value of the energy by hundredths of atomic units.

Card : 1/1

Yutsis, A.P.

USSR/Atomic and Molecular Physics- Physics of the Atom.

D-1

Abs Jour : Referat Zhur - Fizika, No 5, 1957, 11356

Author : Yutsis, A.P., Kibartas, V.V., Pelkyavichyus, I.Yu.

Inst :
Title : The Hartree Self-Consistent Field in the Two-Configuration Approximation for the Two Lower Configurations of the Carbon Atom.

Orig Pub : Liet. mosklu Akad. darbai, Tr. An LitSSR, 1956, B4, 3-14

Abstract : The Hartree self-consistent field method, extended to include the case of the two-configuration approximation, is applied to the lowest configurations of the carbon atom. The Hartree equations, supplemented by configuration terms, are solved for the 2p radial wave functions which are taken into account by the configurations, and the values of the total energy are given. In this approximation, the authors determine the effect of the mass of the spectral lines, arising from transitions between the investigated

Card 1/2

USSR/Atomic and Molecular Physics- Physics of the Atom.

D-1

Abs Jour : Ref Zhur - Fizika, No 5, 1957, 11356

configurations, and compare this effect both with the less accurate previously theoretical result, and with the experimentally-observed isotopic shift.

Card 2/2

Yutsis, A.P.

USSR/Atomic and Molecular Physics - Physics of the Atom.

D-1

Abs Jour : Referat Zhur - Fizika, No 5, 1957, 11355

Author : Batarunas, I.V., Vizbarayte, Ya.I., Yutsis, A.P.

Inst :

Title : The Fock Self-Consistent Field in Two-Configuration Approximation for Atoms of the Bcrn Type.

Orig Pub : Liet. TSR Mokslu Akad. darbai, Tr. AN Lit SSR, 1956, B4, 15-20.

Abstract : Solutions are given for the Fock equation in the two-configuration approximation for the 2p radial wave function, taken into account by the configuration of the two-configuration approximation

$1s^2 2s^2 2p$ -- $1s^2 2p^3$ and the values of the energies of the 2s and 2p electrons for B, C, N^{2+} , and O^{3+} .

Card 1/1

YUTSIS, H.P.

USSR/Atomic and Molecular Physics - Atomic Physics

D-1

Abs Jour : Ref Zhur - Fizika, No 4, 1957, No 8927

Author : Vizbarayte, Ya.I., Batarunas, I.V., Kibartas, V.V., ~~Kutsis~~, A.P.

Title : The Fock Self-Consistent Field in the Two-Configuration Approximation for the Nitrogen Atom in Various Degrees of Ionization.

Orig Pub : Liet. TSR mokslu Akad. darbai Tr. AN Lit SSR, 1956, 5B, 3-10

Abstract : The Fock equation is solved in the two-configuration approximation for a radial wave function $2p$ taken into account by the configuration $1s^2 2p^{q+2}$ of the two-configuration approximation $1s^2 2s^2 sp^q - 1s^2 sp^{q-1}$ at $q = 2, 3$, and 4 for the case of the nitrogen atom. The values of the energies of the $2s$ and $2p$ electrons are determined and compared with experimental data.

Card : 1/1

USSR/Atomic and Molecular Physics - Atomic Physics

B-1

YUTSIS, A. P.

Also Jear : Ref Zhur - Fizika, No 4, 1957, No 8924

Authors : Ushpuliz, K.K., Yanagas, V.V., Radomysel'skiy, S.I.,
Yutis, A.P.

Orig Pub : Liet. TER mokalu Akad. darbai, Tr. AN Lit SSR, 1956, 9B, 11-20

Abstract : The correction coefficient, used in the case of two electrons, is extended to include the case of any number of electrons

$$Z = (n_1, n_2, \dots, n_N) = n_1 + n_2 \sum_{i=1}^N n_{ij} + n_3 \sum_{i=1}^N n_i,$$

where N is the number of electrons, in whose wave function the variables are not completely separated, r_{12} is the distance between the electrons, r_i is the distance between the electron and the nucleus, and n_i ($i = 1, 2, 3$) are constants. A general expression is obtained for the energy in terms of the radial integrals in the case of any number of equivalent electrons. The values of the coefficient in these integrals are given in the case of any number of equivalent p-electrons.

Numerical results are given for the application of the method of incomplete separation of variables to atoms of the lithium, beryllium, boron, and carbon type in configurations, in which all the electrons are in the two p shell.

Card 1/1

YUTSIS, A.P.

USSR/Atomic and Molecular Physics - Atomic Physics

D-1

Abs Jour : Ref Zhur - Fizika, No 4, 1957, No 8925

Author : Levinson, I.B., Vanagas, V.V., Yutis, A.P.

Title : Concerning the Problem of the Use of the Formalism
of Tensor Operators in the Calculation on the Use of the Me-
thod of Incomplete Separation of Variables.

Orig Pub : Liet TSR mokslu Akad. darbai, Tr. AN LitSSR, 1956, 5B, 21-32

Abstract : Using the mathematical formalism of tensor operators, a
method is developed for integrating the expressions for the
energy over the angle and spin variables in the case of
incomplete separation of variables in the wave functions of
the equivalent electrons.

Card - 1/1

YUTSIS, A.P.

Category : USSR/Atomic and Molecular Physics - Physics of the Atom

D-1

Abs Jour : Ref Zhur - Fizika, No 2, 1957 No 3359

Author : Tsyunaytis, G.K., Kibartas, V.V., Yutsis, A.P.

Inst : Vil'nyus University, Physicotechnical Institute, Academy of Sciences
Lithuanian SSR

Title : Self-Consistent Field for the Fundamental Configuration of Helium Type
Atoms.

Orig Pub : Optika i spektroskopiya, 1956, 1, No 1, 5-8

Abstract : A solution was obtained for the equations of the self-consistent field for the ground states of H^- , He, Li^+ , Be^{2+} , B^{3+} , and C^{4+} . The values of the energy parameters ξ_{1s1s} of the radial integral $F_0(1s1s)$ and of the energy are given for all cases, as are the radial functions of H^- , B^{3+} , and C^{4+} . All the calculations were performed with greater accuracy than in the calculations previously made on analogous atoms.

Card : 1/1

YUTSIS, A. P.

Category : USSR/Atomic and Molecular Physics - Physics of the atom.

D-1

Abs Jour : Ref Zhur - Fizika, No 1, 1957 No 733

Author : Vizbarayte, Ya.I., Kantserevichyus, A.I., Yutsis, A.P.

Inst : Vil'nyus University

Title : The Fok Self-Consistent Field for the Excited Helium Atom

Orig Pub : Optika i spektroskopiya, 1956, 1, No 1, 9-16

Abstract : Solutions for the equations of the Fok self-consistent field are given for the $1s2s$, $1s2p$, $1s3p$, and $1s4p$ configurations of the helium atom. A possible simplification of the Fok equations is considered. The simplified Fok equations are solved for the $1s5p$, $1s6p$, $1s3d$, $1s4d$, $1s5d$ and $1s6d$ configurations of the helium atom. These solutions are used to determine the values of the total energy. The values of the total dipole strength are given for the transitions between the ground configuration of the helium atom and the excited configurations, and also between the excited configurations themselves.

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Yutsis, A.P.

Category : USSR/Atomic and Molecular Physics - Physics of the Atom

D-1

Abs Jour : Ref Zhur - Fizika, No 2, 1957 No 3360

Author : Vizbarayte, Ya, I., Shironas, V.I., Kavetskis, V.I., Yutsis, A.P.

Title : The Fok Self-Consistent Field in the Multi-Configuration Approximation for the Helium Atom

Orig Pub : Optika i spektroskopiya, 1956, 1, No 3, 277-281

Abstract : Solutions to the Fok equations are given in the two-configuration approximation for the configurations $2p^2$, $2s^2$, $3d^2$, and $3p^2$, considered as accountable configurations with respect to the ground configuration of the helium atom. With the aid of these solutions, the authors determined the values of the correction to the energy of the ground configuration at various multi-configuration approximations. Also given are the values of the correction to the energy, obtained with the aid of the self-consistent Fok field in the six-configuration approximation $1s^2 -- 2p^2 -- 2s^2 -- 3d^2 -- 3p^2 -- 2p3p$, and were compared with the experimental values of the energy.

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July 1957, A-12
Category : USSR/Atomic and Molecular Physics - Physics of the Atom

D-1

Abs Jour : Ref Zhur - Fizika, No 2, 1957 No 3358

Author : Vizbarayte, Ya.I., Kavetskis, V.I., Yutsis, A.P.

Title : Multi-Configuration Approximation in the Case of Atoms of the Helium Type.

Orig Pub : Optika i spektroskopiya, 1956, 1, No 3, 282-284

Abstract : The multi-configuration approximation was applied to the fundamental configuration of atoms of the helium type from H^- to C^{4+} using a method, by which the results of the self-consistent field are used for the fundamental configuration, and the corrections to the energy for the multi-configuration approximation are determined with the aid of hydrogen-like analytic wave functions. The values obtained for the total energy were compared with the results of the method of incomplete separation of variables and with the experimental data.

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Yut'sis, A.P.

USSR/Atomic and Molecular Physics - Physics of the Atom.

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Abs Jour : Referat Zhur - Fizika, No 5, 1957, 11358

Author : Yut'sis, A.P., Ushpalis, K.K., Kavetskis, V.I., Levinson, I.B.

Inst : Vilnius University, USSR

Title : Total Dipole Strength in the Approximation of Incomplete Separation of Variables for Two-Electron Atoms.

Orig Pub : Optika i spektroskopiya, 1956, No 5, 601-605

Abstract : The strength of the dipole transitions $1s^2 \rightarrow 1s2p$, $2s^2 \rightarrow 1s2p$, $2p^2 \rightarrow 1s2p$ are calculated for He, Li^+ and Fe^{2+} . For the states $n\ell^2$, the authors employ wave functions with incomplete separation of variables, including the factor

$M_1 + M_2 r_{12} + M_3 (r_1 + r_2)$. The $1s2p$ state is described

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USSR/Atomic and Molecular Physics - Physics of the Atom.

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Abs Jour : Ref Zhur - Fizika, No 5, 1957, 11358

in the approximation of total separation of variables. The parameters of the analytic wave functions are taken from previous works. It is noted that two-electron transitions are possible when using incomplete separation of variables. For the transition $2s^2 \rightarrow 1s2p$ the authors obtained dipole strengths of 0.4, 0.01 and 0.002 for He, Li^+ , and Be^{2+} respectively. For the singlet transitions $2p^2 \rightarrow 1s2p$, the use of incomplete separation of variables leads to a very substantial reduction in the dipole strength. As the charge of the nucleus increases, the change becomes less.

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Jucys A. P.

GIEMBOKIS, J.; JUCYS, A.

Concerning the formation of approximate radial wave functions. In Russian.

p. 11 (Lechemas, Gersonas) No. 2, 1957, Vilnius, Lithuania

SO: MONTHLY INDEX OF EAST EUROPEAN ACCESSIONS (EEAI) LC, VOL. 7, NO. 1, JAN. 1958

JUCYS, A.

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PERIODICAL: DARBAT. SERIJA B. TRUDY. SERIJA B. No. 2, 1958.

Jucys, A., and others. Multiconfigurational approximation and its further development. In Russian. p. 3.

Monthly list of East European Accessions (EEAI) LC. Vol. 8, No.2,
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JUCYS, A.

SCIENCE

PERIODICAL: DABAY. SERIJA B. TRUDY, SERIJA B. No. 2, 1958.

Jucys, A. The self-coordinated Fock field in a multiconfigurational approximation for the negative ion of sodium. In Russian. p. 17.

Monthly list of East European Accessions (SEAI) LC. Vol. 8, No. 2,
February 1959, Unclass.

JUCYS, A. AND OTHERS.

SCIENCE

PERIODICAL: DARBAL. SERIJA B. TRUDY. SERIJA B. No. 3, 1958

Jucys, A. and others. Possibilities for the improvement of methods of the quantum and mechanical calculation of the atom and their interrelation. In Russian. p. 35.

Monthly list of East European Accessions (EEAI) LC, Vol. 8, No. 2,
February 1959, Unclass.

YUFSIS, A.P. [Jucis, A.P.]

Generalized method based on Fok's self-consistent field and
some instances of its application. Fiz.sbor. no. 4:86-89
'58. (MIRA 12:5)

1. Fiziko-tekhnicheskiy institut AN Litovskoy SSR Vil'nyuskiy
gosudarstvennyy universitet imeni V.Kapsukasa.
(Electrons) (Field theory)

YUTSIS, A.P.; VIZBARAYTE, Ya. I.; KAVETSKIS, V.I.; BATARUNAS, I.V.

Approximate models of dielectron state and so-called anomaly in carbon, nitrogen and oxygen spectra. Izv. AN S.S.S.R. Ser. fiz. 22, no. 6:665-667 Jo '58. (MIRA 11:7)

1. Institut fiziki i matematiki Akademii nauk Litovskoy SSR, Vil'nyuskiy gos. pedagogicheskiy institut i Vil'nyuskiy gos. universitet im. V. Kapaukas.
(Quantum theory)

AUTHORS: Iutsis, A. P., Vizbarayte, Ya. I.,
~~Kavetskiy~~, V. I., Batarunas, I. V. SOV/48-22-6-6/28

TITLE: The Approximation of the Models of Two-Electron States and the
 So-Called Anomaly in the Spectra of Carbon, Nitrogen, and Oxygen
 (Priblizheniye modeli dvukhelektronnykh sostoyaniy i tak
 nazyvayemaya anomaliya v spektrakh ugleroda, azota i kisloroda)

PERIODICALS: Izvestiya Akademii nauk SSSR, Seriya fizicheskaya, 1958, Vol. 22,
 Nr 6, pp. 665-667 (USSR)

ABSTRACT: For quantum-technical calculations of the atom: the method of the
 incomplete separation of variables (Ref 1) and that of multicon-
 figuration approximation (Ref 2) are employed, which are both
 difficult from a mathematical point of view. Simplification may
 be attained by using these methods for two-electron systems. It
 is therefore assumed in this paper that also other calculations
 can be carried out on the basis of the two-electron systems by
 means of approximation methods. The second and more simple method
 is here given preference.
 The chapter entitled: "The Case of Three-Electron Systems" deals
 with the ground state and the first excitation state for atoms

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The Approximation of the Models of Two-Electron States
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of the lithium type. With respect to the two internal electrons a 5-configuration approximation: $1s^2-2p^2-2s^2-3d^2-3p^2$ is used (Ref 4.) and external electrons are dealt with by the approximation method for electron states. The chapter: "The Problem of Anomaly in the Spectra of Carbon, Nitrogen, and Oxygen" deals with the values of $q = 2, 3, 4$, where, in the intervals between the energies of individual terms, the anomaly occurs; for carbon or oxygen the experimental value of

$\frac{1s - 1p}{1p - 3p} = 1,13$ and the theoretical value is 1,5. In the case of nitrogen the experimental value obtained is 0,5, the theoretical value is 0,67. If the problem is solved according to the two-electron state, the values 1,1 and 0,5 respectively are obtained, which are near the experimental values. In the chapter: "Evaluation of Results" the conclusion is arrived at that in multi-configuration approximations carried out on the basis of two-electron states the conception of the shell structure of

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The Approximation of the Models of Two-Electron States
and the So-Called Anomaly in the Spectra of Carbon,
Nitrogen, and Oxygen

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electrons in atoms is maintained. There are 12 references, 7 of
which are Soviet.

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Mathematics, AS Lithuanian SSR, Institute of Pedagogics and State
University imeni V. Kapsukas in Vil'nyus)

1. Atoms--Mathematical analysis 2. Carbon--Spectra 3. Nitrogen
--Spectra 4. Oxygen--Spectra

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